Teepack Spezialmaschinen
GmbH & Co.KG
Düsseldorfer Straße 73
40667 Meerbusch

Method and apparatus for the continuous production of infusion bags as well as infusion bag

The invention relates to a method for the continuous production of infusion bags, in particular for tea, by depositing single substance quantities on a filter paper web and forming a tube as well as forming individual chambers, which are closed on all sides and at least contain one substance quantity, respectively, and which are attached to a carrier material. The invention also relates to an apparatus for the continuous production of infusion bags, in particular for tea, comprising a dosing device for substance quantities and a device for forming a tube, which is divided into single chambers by transverse sealing. Finally the invention relates to an infusion bag.

Many kinds of methods and apparatuses for the continuous production of infusion bags as well as corresponding infusion bags are known. In one of the known embodiments single substance quantities of the substance to be infused are deposited on a filter paper web and thereafter a tube is formed, which is divided by transverse seams into single chambers, which are closed on all sides and at least contain a substance quantity, respectively. The tube can be formed by overlapping folding of the filter paper web and closing by means of a longitudinal seam or by supplying of another filer paper web and applying two longitudinal seams. The chambers are finally attached to the carrier material which serves to handle and suspend the infusion bag.

It is the o b j e c t of the invention to provide a simple method and a constructively simple apparatus for the continuous production of infusion bags, working reliably at a high speed. The infusion bag according to the invention shall have a simple design and a low price.

The s o l u t i o n of this problem by means of the method according to the invention is characterized in that the chambers are formed by a transverse seam, which simultaneously comprises the rear seam of the one infusion bag and the front seam of the succeeding infusion bag and a perforation interposed between both seams, at which the infusion bags are separated in course of the process. Such a transverse seam can be best produced by ultrasound, since ultrasound simultaneously enables welding and perforating.

The method according to the invention offers the advantage that after deposition of single substance quantities on a filter paper web and formation of a tube, the chambers, which are closed on all sides, are produced by one single transverse seam. The method according to the invention always forms the same transverse seam, whereby the method is substantially simplified.

According to another characteristic of the invention, two corners can be punched laterally of a central web during the production of the transverse seam, so that the front seam is V-shaped. The perforation is limited to the region of the central web. The infusion bag is given a special head design.

According to another characteristic of the method according to the invention, the chambers of the chamber tube are isolated by extension at the perforation and thereafter attached to a carrier material web. The extension by some few millimetres is achieved by a speed increase, so that the isolated chambers are attached to a carrier material web, which is longer by the isolation gap. The fixation is preferably carried out by welding by means of ultrasound.

The carrier material web is also perforated before the attachment or simultaneously with the attachment, so that the chambers, which are attached or to be attached to the carrier material web, are isolated by extension of the carrier material web. In a practical

embodiment of the invention the chambers can also be formed by ultrasound welding of at least two filter paper webs, which are placed in parallel to each other and/or superposed (multiple web process).

The method according to the invention enables to attach the isolated chambers of two chamber tubes simultaneously or successively to the carrier material web, so that preferably double chamber bags are produced.

The apparatus according to the invention for the continuous production of infusion bags comprises a dosing device for the substance quantities and a device for forming a tube, which is divided into single chambers by transverse seams. It is characterized in that in the transverse sealing station a sonotrode is arranged, which cooperates with a sealing roller comprising a recess for the substance quantities contained in the chambers, in order to produce a double seam separated by a perforation. In another station the chambers are isolated by extension and attached to a perforated carrier material web.

This further station is also provided with a sonotrode and a sealing roller for welding the isolated chambers to the carrier material web by ultrasound. In this other or a similar additional station the chambers of a second chamber tube can be welded to the carrier material web, so that double chamber bags are produced.

Finally the apparatus according to the invention comprises a separating station for isolating the sections of the carrier material web, which are respectively connected to one or two chambers.

The infusion bag of the invention is formed by at least one chamber containing a substance quantity of the substance to be leached out and being produced by transverse sealing of a tube made of filter material, and a section of a carrier material web connected to a chamber. It is characterized in that the transverse seams of the chamber and/or the carrier material are welded to the chamber by ultrasound. Herein, the transverse seam is formed by a front and a rear seam having a perforation placed in between.

Further details, characteristics and advantages of the object of the invention appear from the following description of the annexed drawings, in which the infusion bag according to the invention, the method according to the invention and the associated apparatus are diagrammatically represented. In the drawing:

Fig. 1 is a diagrammatic view of the apparatus according to the invention,

Figs. 2-9 respectively show a side view and a plan view of the product produced by the apparatus at the places marked in the diagram and

Fig. 10 is an enlarged representation of the double seam.

The apparatus schematically represented in Fig. 1 comprises a dosing device 1, which deposits single substance quantities 3 on a filter paper web 2 (cf. Fig. 3) and forms the filter paper web 2 into a tube by overlapping folding it around its longitudinal axis and closes it by a longitudinal seam 4 indicated in Fig. 3.

In a transverse sealing station 5 the tube is divided into single chambers 6, which are closed on all sides. For this purpose a sonotrode 7 is provided, which cooperates with a sealing roller 8. The sealing roller 8 has recesses 8a for the substance quantity 3 contained in the respective chamber 6 and rotates with a speed corresponding to the speed of the supplied filter paper web 2.

As shown in Fig. 4, the transverse sealing consists of a double seam 9, which respectively comprises a rear seam 9a and a front seam 9b. A perforation 9c is formed between these seams 9a and 9b, as it is shown by the enlarged drawing of Fig. 10.

Furthermore it is shown in this drawing, that simultaneously with double seam 9 two triangular corners 9d are punched laterally of the central web of front seam 9b. Perforation 9c is accordingly limited to the central region. Front seam 9b, which forms the head region of the infusion bag, has the form of a V with the central web as apex.

The filter paper web 2 divided into single chambers 6 is now supplied to another station 10, in which the chambers 6 are separated at perforation 9c by extension. For this

purpose they are supplied to a sealing roller 11 provided with recesses 11a, the rotational speed of which is slightly higher than the supply speed of filter paper web 2.

In a practical embodiment the chambers have a length of 63 mm and are separated at 5 mm from each other. The rotational speed of sealing roller 11 is higher by this amount than the one of sealing roller 8.

In the region of this other station 10, the isolated chambers 6 are attached to a carrier material web 12, which is cut in longitudinal direction and perforated in a passing station 13, as it is shown by Fig. 9. The attachment is carried out by ultrasound by means of a sonotrode 14 in the region of the central web of front seam 9b. At the place referenced by VI a number of chambers 6 is thus attached to one side of carrier material web 12 at the same mutual distance, as it is shown by Fig. 6.

In the diagram of Fig. 1 it is shown, that substance quantities are deposited on another filter paper web 2 by a dosing device 1a and the filter paper web 2 is formed into a tube, which is divided into single chambers 6 by another transverse sealing station 5a. In this sealing station 5a a sonotrode 7 and a sealing roller 8 also produce a double seam 9 comprised of a rear seam 9a, a front seam 9b and a perforation 9c placed in between, wherein corners 9d are punched. At the place referenced by IV there is thus another chamber tube present, which is now supplied to a station 10a corresponding to station 10.

In this additional station 10a the chambers 6 of the second filter paper web 2 are isolated by extension by means of a sealing roller 15. Simultaneously they are attached to the free side of the carrier material web 12 by a sonotrode 16, in the region of the central web of their front seam 9b. At the place referenced by VII there is thus a carrier material web present, according to Fig. 7, to both sides of which chambers 6 are attached.

In a separating station 17 the carrier material web 12 is now extended at the perforation. Hereby the infusion bags, which are in this exemplary embodiment formed by two chambers 6 and the section of carrier material web 12, are separated and isolated, according to Fig. 8.

Reference list

1	dosing device
1a	dosing device
2	filter paper web
3	substance quantity
4	longitudinal seam
5	transverse sealing station
5a	transverse sealing station
6	chamber
7	sonotrode
8	sealing roller
8a	recess
9	double seam
9a	rear seam
9b	front seam
9c	perforation
9d	corner
10	station
10a	station
11	sealing roller
11a	recess
12	carrier material
13	passing station
14	sonotrode
15	sealing roller
16	sonotrode
17	separating station